

用函数求根法解系统控制问题

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摘要 提供了一大类系统控制问题的求解路线. 当所考察的问题可转化为参数估计时, 可以把问题进一步转化为未知回归函数求根(根即待估参数)的问题, 而扩展截尾的随机逼近算法是解决这类求根问题的恰当工具. 给出了算法的一般收敛定理, 它已在一系列系统控制问题中得到应用. 以ARMA过程的辨识, Hammerstein系统的适应调节为例, 展示了上述求解路线的具体实现, 并附有相应的模拟计算实例. 这种方法提供的估计是递推的, 并且以概率1收敛到真值.

关键词 [求解路线](#), [参数估计](#), [未知函数求根](#), [系统辨识](#), [ARMA](#), [适应调节](#).

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Solving Problem from Systems and Control by Root-Seeking Method for Functions

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Abstract A solution route for a considerable class of problems arising from systems and control is provided in the paper. When the problem under consideration can be transformed to parameter estimation, then it can further be transformed to a root-seeking problem for a unknown regression function with root equal to the parameter to be estimated. The stochastic approximation algorithm with expanding truncations is an appropriate tool to solve the problem in question. Its general convergence theorem is given in the paper, and it has successfully been applied in solving a series of problems from systems and control.

Identification of ARMA

processes and adaptive regulation for Hammerstein systems described in the paper serve as examples of realizing the solution route given in the paper.

Corresponding simulation results are also provided. The estimates according to this solution route are recursive and convergent with probability one.

Key words [Solution route](#) [parameter estimation](#) [root-seeking for unknown function](#) [system identification](#) [ARMA](#) [adaptive regulation](#).

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